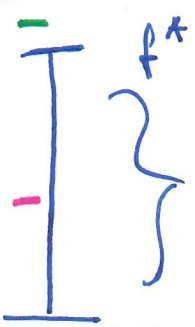
CS5811
Sep. 16, 2020
Wednesday (1)

Previous class

- Designing heuristic functions: $h(n)$
  - dominance
  - consistency
- Iterative deepening A^* search
  (it is really an iterative depth-first search with $f(n)$ as a limit rather than depth)
  $= g(n) + h(n)$

Today

- Constraint satisfaction problems

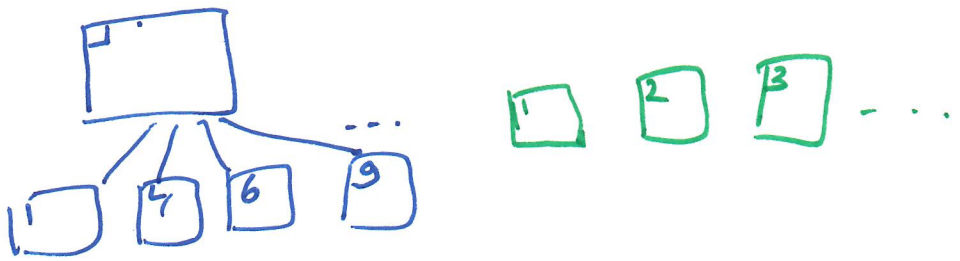


Casting sudoku as a search problem

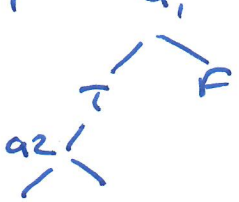
state:

actions:

goal test: all cells are filled with (valid) (values) values that satisfy the constraints



SAT: $(a_1 \vee a_2 \vee a_3) \wedge (\neg a_3 \vee a_4 \vee a_5) \wedge \ldots$
F F T F F F

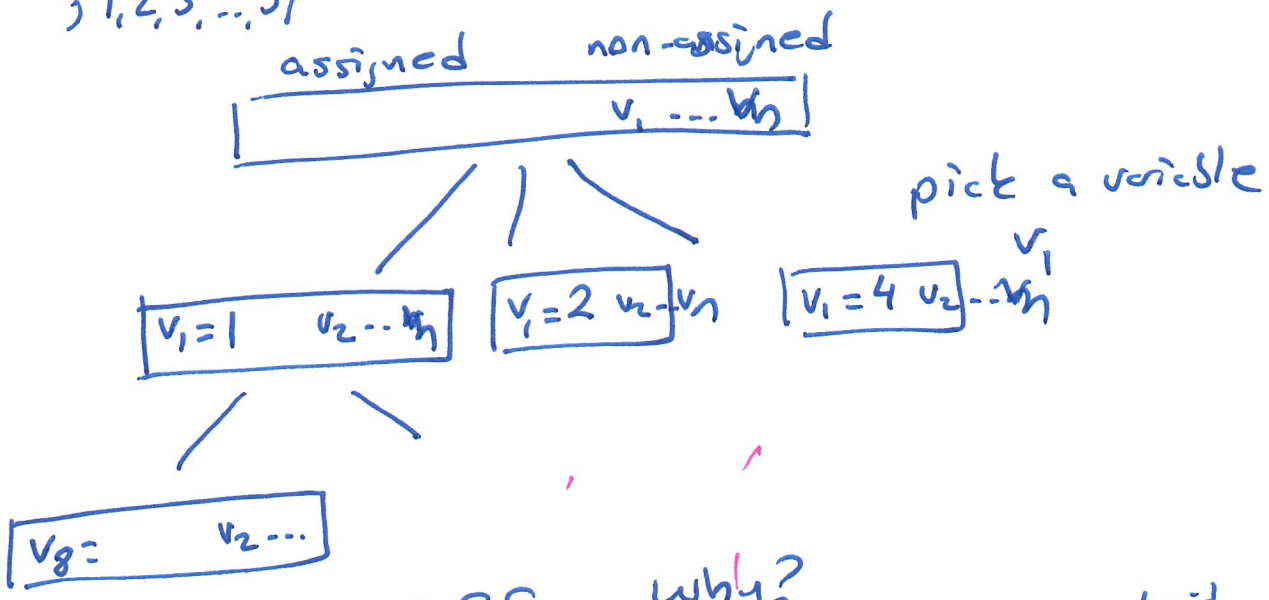


Sudoku example

	1	2	3	4	5	6	7	8	9
1				4	7		2	8	6
2	7					2			4
3			3				9	5	7
4	8	4		3					1
5									
6	5					8		7	3
7		9	5				6		
8				5			7		2
9		7			6	1			

CSP: v_1 v_2 ... v_n

$\{1, 2, 3, \ldots, 9\}$



which one

DFS

BFS

why?

better space complexity

unless there is a notion of optimality

level $\longrightarrow$ n

What is the depth of the solution? $d = n$

$\hookrightarrow$ The solution will be there